Causes and predictors of mental disorders during the COVID-19 pandemic

Tyuvina N.A., Vysokova V.O., Maksimova T.N., Prokhorova S.V.
Department of Psychiatry and Narcology, I.M. Sechenov First Moscow State Medical University (Sechenov University), Ministry of Health of Russia, Moscow
11, Rossolimo St., Build. 9, Moscow 119021, Russia

The ongoing pandemic of the new coronavirus infection COVID-19, the increase in the number of infected with coronavirus and the number of deaths, the lack of reliable forecasts and the emergence of new circumstances that complicate people's lives, increases the urgency of this problem and dictates the need for further research into the causes and factors contributing to the occurrence of mental disorders. The review presents data on the causes of mental disorders during the coronavirus pandemic: the toxic effect of the virus on the brain and the psychogenic effect of the pandemic and related factors (self-isolation and restrictive quarantine measures, media escalation, unemployment and economic losses, stigmatization) on the mental state. Predictors of mental disorders are considered both in people who have not previously suffered from mental illness, and already have a psychiatric diagnosis.

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Contact: *Nina Arkadievna Tyuvina;* ***natuvina@yandex.ru***
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The COVID-19 pandemic has had a serious impact on both people's physical health, and their mental state [1,2]. The fear of infection, lack of knowledge about the virus and its long-term health consequences, lack of proven effective treatment regimens, and social and economic commotion caused by the pandemic have negatively affected the population's mental well-being [3–6].

Mental disorders during the epidemic can be divided into two groups. The first group includes various exogenous reactions that have developed as a result of direct impact SARS-CoV-2 on the brain or as a result of virus-induced hyperinflammatory and hypercoagulable conditions, as well as post-infectious immune-mediated processes [7].

The second group includes mental disorders caused by the influence of psychogenic factors associated with the epidemic [3, 4]. They include forced long-term isolation, inability to communicate and see loved ones, loss of work or transition to unusual remote forms of communication and activities, which radically changed the usual lifestyle [5, 6]. Fear for one's physical health is reflected in an increased demand for personal protective equipment, increased demand for medical aid, often for no apparent reason. These circumstances have led to mental disorders, including among people who have never seen a psychiatrist before [7].

Some of the first reports of adverse mental health effects emerged in China, where in Wuhan, the initial epicenter of the outbreak, mental deterioration was found in health care providers, adult working population [7] and hospitalized patients with COVID-19 [8]. Due to the fact that COVID-19 has spread to more than 200 countries, increased incidence of various mental disorders is observed almost all over the world [7, 8].

Epidemiology

A study of nearly 70 million electronic health records from 54 healthcare organizations in the United States found that 18.1% of patients hospitalized with COVID-19 experienced some type of mental disorder within 14–90 days of the diagnosis, including 5.8% of patients who were diagnosed with a psychiatric condition for the first time [8]. By comparison, less than 2.8% of those hospitalized with influenza were diagnosed with a mental illness during the same period. Among all patients who were hospitalized for COVID-19 and had not previously sought psychiatric care, the rate of newly diagnosed mental illnesses was higher compared with those who were hospitalized for other reasons. At the same time, there was a marked increase in the number of anxiety disorders, insomnia, and cognitive impairment [9].

A study of the neurological and neuropsychiatric consequences of COVID-19 conducted in the United Kingdom found that one third of hospitalized patients with COVID-19 were diagnosed with symptoms of mental disorders, as reported by doctors at three hospitals within 20 days. Almost a third of the patients had some abnormalities in their mental status, and more than 50% of them had a psychiatric diagnosis; in 92% of cases, these were newly diagnosed psychoses, and more than half of them occurred in patients under the age of 60 years [10].

British researchers conducted a survey of more than 80 thousand people of various socio-demographic groups who have had the coronavirus infection. They tested the participants using the Great British Intelligence Test, a more accurate analogue of the IQ. As a result, cognitive impairments were revealed, the severity of which correlated with the severity of the infection. During the follow-up for 9 months, cognitive indicators practically did not improve [11].

Psychogenic factors influencing the occurrence of mental disorders during the epidemic

Psychogenic factors that accompany the epidemic and contribute to the emergence of mental disorders include: isolation, stigmatization, economic commotion, and widespread media coverage of the situation.

Studies of psychogenic factors during previous epidemics confirm their influence on people's mental state. Loneliness, boredom, and frustration during isolation; stigmatization, and feelings of guilt for spreading the virus among family members and acquaintances; economic losses caused by the virus; loss of the job and reduced income have an impact on people's mental state [12].

Stigmatization. The epidemic of the new coronavirus infection has led to the creation of unjustified stereotypes and negative labels, stigmatization of certain population groups due to their possible impact on the spread of the disease. In the case of coronavirus infection, stigmatization concerns foreigners who come from countries with a large number of infected people; medical workers who face the infection every day and are at high risk of being infected or carrying the virus; marginalized segments of the population who are considered potential vectors of the infection due to their failure to comply with personal protection rules.

Studies on the impact of previous epidemics on mental health indicate that stigmatization of people suffering from SARS in 2003 was felt even many years after the end of the epidemic, making it difficult for many to return to their normal lifestyle [13]. Medical professionals, especially general practitioners working with SARS patients, were mostly subject to stigmatization [14]. By analogy with previous outbreaks of infections, the COVID-19 epidemic can also cause manifestations of racism, discrimination and marginalization with all their social and economic components [15]. There are already reports of verbal and physical attacks on Chinese and other people who "look like Chinese", as well as of their exclusion from medical facilities and violations of basic human rights [16].

Stigmatized segments of the population tend to seek medical care late and hide important medical history data, especially when traveling abroad. This behavior, in turn, increases the risk of transmission in the community. According to the World Health Organization, it is necessary to properly inform people about the ways of transmission of the infection, the risks of infection, excluding false information that leads to such consequences and divisions within society [17].

Quarantine. The rapid spread of infection forced many countries to introduce quarantine measures as the main method of controlling an increase in morbidity. Mass quarantines and forced self-isolation caused panic, anxiety, and stress due to such factors as feeling defenseless, lonely, and losing control of one's life. These phenomena become even more significant in cases where separation from the family is required: there is uncertainty about the possibility of obtaining the necessary assistance and personal protective equipment. Studies of previous large-scale epidemics (SARS, MERS, Ebola virus disease) indicate that the effects of the quarantine measures can occur during isolation and include such symptoms as irritability, fear of being infected or infecting relatives, confusion, denial of problems, anxiety, depressed mood, insomnia; however, there may be more serious long-term consequences, including suicide [18]. In the studied cases, people in isolation suffered from constant anxiety and fear for their health, which in some patients developed into symptoms of obsessive-compulsive disorder (OCD), manifested in the constant need to take their temperature, sterilize and wash their hands [19]

Two recent articles report a series of newly diagnosed psychoses among patients admitted to hospitals in Italy during the second month of the national isolation [20]. All the patients had no psychiatric history, and they had delusions and hallucinations. Some patients were diagnosed with somatoform disorders, accompanied by symptoms similar to the manifestations of SARS-CoV-2 infection. The authors suggest that the stress associated with a new potentially fatal illness and isolation may trigger the onset of psychosis. Studies have shown that perceptual disturbances (mainly derealization and depersonalization), subclinical psychotic symptoms, and beliefs in various pseudoscientific theories have increased since the social quarantine in Spain [21].

Economic factors. Financial losses can become a serious problem both during and after the quarantine due to job loss or reduced income during the period of restrictive measures [19]. They can lead to serious socio-economic consequences, that persist even several months after the quarantine and are accompanied by such psychopathological symptoms as anger, aggression, and anxiety [22, 23]. Economic consequences are especially grave for those who are involved in industries directly related to joint participation of a large number of people: entertainment industry, public catering enterprises, sport complexes. At the same time, state aid, as a rule, is not enough to maintain the same standard of living, which causes dissatisfaction and a marked decrease in mood. Other studies have found that those with a high level of income are better able to tolerate the temporary suspension of funds than people with low incomes. This leads to development of symptoms of depression and post-traumatic stress disorder in the latter [24]. In order to prevent mental disorders, people who lose their income due to restrictive measures should be provided with financial support, if possible, throughout the entire quarantine period. Employers themselves can provide preventive approaches, such as remote access, providing psychological assistance to employees during the epidemic, as well as ensuring a smooth transition to a new work format in order to gradually adapt to it [25].

Mass media. Stress among the population increases due to widespread media coverage of the epidemic and related circumstances, often with unverified and contradictory information [17]. *«I predict that the next major outbreak — whether it's a deadly strain of flu or something else — won't happen due to the lack of preventative technologies. On the contrary, the emotional contagion involved in digital technologies can so undermine the credibility of vaccines that they become meaningless. The flow of contradictory information, misinformation and manipulated information on social networks should be recognized as a global threat to public health,"* — this statement made in 2018 by Heidi Larson, an anthropologist and the founder of the Vaccine Confidence Project, became prophetic [26].

Creating interactive maps of the spread of infection and updating statistics in real time helps countries to introduce

restrictive measures in time, but it also leads to sad consequences in terms of people's mental health [27]. Within a few days of the outbreak of COVID-19 in China, the "social media panic", replete with unreliable as well as distorted information, spread much faster than the coronavirus itself [28]. The WHO Director-General called it the "coronavirus infodemic", which generates fear and panic, incredible and shocking rumors, vivid news propaganda and fake sensations [29]. Conflicting information in the media and a lack of available and correct data can lead to requests for information from unreliable and dubious, but easily accessible sources in social networks.

COVID-19 has become popular online content: many bloggers, groups, or personal users on YouTube, WhatsApp, Facebook, Instagram, and Twitter have started businesses to profit from the popularity of COVID-19 [30]. The abundance of false stories about infections created in order to gain popularity on Internet platforms causes a number of mental disorders in their users, such as anxiety, phobias, panic attacks, depressive episodes, obsessions, irritability, illusions of symptoms similar to those observed in COVID-19, and other hypochondriacal symptoms. Due to the increase in hypochondriac experiences, there is a sharp increase in the number of visits to medical institutions caused by fear of irreversible consequences of infection presented in the media [31].

In contrast to the above mentioned, communities of so-called "COVID-dissidents" were created, convinced that the government had deliberately initiated the epidemic in order to reorganize the economy or establish a global system of tracking citizens [32]. This leads to deliberate ignoring of preventive measures and refusal of medical assistance. Some internet resources recommend the use of various ineffective means of prevention, and promote the refusal of vaccinations, which leads to fatal consequences [33].

Risk factors for mental disorders during the epidemic

In addition to causal factors (infectious, psychogenic), there are also various predictors, i.e. factors that predispose to the development of a mental disorder. Studies have identified several such factors that contribute to the occurrence of mental disorders against the background of the epidemic. Women tended to be more susceptible to developing symptoms of various psychiatric disorders, including depression, anxiety, and post-traumatic stress disorder [34, 35]. Some authors attribute this to the fact that women are more likely than men to work in areas such as retail, services and healthcare, where the risk of infection is high. Other researchers attribute this to different neurobiological responses to stress in men and women [36].

A number of studies have found that a low level of education is a factor that correlates with more pronounced depressive symptoms [30]. However, other authors claim that people with higher education and high qualifications suffer from more severe depression compared with less educated people, service workers or those employed in industry [37].

Another risk factor is loneliness. For example, researchers found that divorced / widowed people had more anxiety symptoms than married people [38].

The predisposing factors also include personal characteristics that allow to predict psychopathological disorders. For example, people with avoidance behaviors, cyclothymic, depressive, and anxious personalities are more vulnerable to stress [39].

Age is also important for development of mental disorders. According to some data, psychopathological symptoms were observed more frequently during the pandemic in people under 40 years of age than in older groups. This may be due to their role and influence in the family related to caregiving and caring for other members, especially when financial and emotional support to children or the elderly is needed. Loss of the job and unpredictability of current life events caused by the COVID-19 pandemic can be particularly stressful in this age group. In addition, a significant proportion of people under the age of 40 are students who may also experience greater emotional stress due to the closure of educational institutions, lower efficiency of online studies and rescheduling exams [40].

People with chronic somatic diseases show more anxiety and concern about contracting the coronavirus infection, which is justified, since previous and current diseases can contribute to weakening of the immune system, which, in turn, makes them susceptible to infection and increases the risk of death [41]. Not only medical articles, but also mass media often point out that COVID-19 has a significantly higher mortality rate among patients with diabetes, hypertension, and coronary heart disease; although this is not proven [42], it creates prerequisites for fear for their lives. In addition, another practical aspect of concern for patients with pre-existing diseases may be a delay or unavailability of medical services and treatment due to the COVID-19 pandemic. Individuals with a history of psychiatric disorders or ongoing mental illnesses also tend to be more sensitive to external stressors, such as social isolation associated with the pandemic [31].

Impact of the epidemic on the mental state of people without mental illness

The literature discusses a wide range of psychosocial consequences that the pandemic can cause in the general population. Mass fear of COVID-19, referred to as "coronaphobia" [31], is probably associated with uncertain nature and unpredictable course of the disease, intolerance to uncertainty, perceived risk of infection, and avoidance reactions among people, including mentally healthy people who have not previously sought psychiatric help [43]. During outbreaks of infections, news of the first death, an increase in the number of new cases and deaths, and increased media attention to the epidemic can increase people's fears, frustration, helplessness, and anxiety about the current situation. This leads to inappropriate and not always adequate actions of the alarmed public regarding health protection and unjustified requests for help, which can create conflict between doctors and patients, harm epidemic control programs and undermine social stability [44]. People who are overly concerned about their health may panic about the possible lack of emergency care and basic isolation services, and this ungrounded panic may lead to a tendency to accumulate basic necessities (hand sanitizers, medications, protective masks, or even toilet paper). Such "herd behavior" [45] can have a detrimental effect on the community that really needs these basic necessities, and may even contribute to undisguised black marketing leading to social upheaval [46].

For people who have lost friends, colleagues, and loved ones due to COVID-19, inability to bury and cremate can lead to anger, resentment, psychological trauma, and long-term psychiatric consequences [44].

Impact of the epidemic on the course of diagnosed mental illnesses

Patients with an established diagnosis of a mental disorder are more likely to develop infectious diseases and are at significant risk of developing more severe somatic and mental consequences during a potentially fatal epidemic, such as the COVID-19 pandemic. Cognitive decline, low awareness, impaired risk assessment, and reduced personal hygiene may increase the chances of infection in this category of individuals [47]. In addition, social discrimination against mentally ill people makes their treatment for COVID-19 infection more difficult [48]. Patients with psychiatric disorders are also prone to relapse or worsening of pre-existing disorders. For example, patients with obsessive-compulsive disorder add frequent body temperature checks, endless hand washing, food and clothing sanitization, and so on, to their obsessions. In addition, strict national regulations regarding the movement of people and quarantine can disrupt the schedule of medical counseling and create difficulties in obtaining prescribed psychotropic drugs [49]. Interestingly, people with a high degree of anxiety about their health (patients with generalized anxiety disorder, somatoform disorder, obsessive-compulsive disorder) are more likely to misinterpret harmless physical symptoms and sensations as evidence that they have dangerous diseases, which, in turn, can increase their anxiety and suffering, affect their behavior and decision-making ability, and ultimately impose an additional burden on public health [48].

Domestic studies also confirm a high probability of worsening the course of pre-existing mental disorders against the background of the pandemic, which was noted in 20.9% of the studied cases [50].

Conclusion

Thus, literature data suggest that, firstly, the coronavirus infection itself can be a cause of various organic mental disorders. Secondly, the COVID-19 epidemic, and associated quarantine measures and social consequences create a traumatic situation that contributes to the emergence of new disorders or exacerbation of already existing mental conditions. The ongoing pandemic, the growing number of people infected with coronavirus and the number of deaths, the lack of reliable forecasts and the emergence of new circumstances that make life difficult, increase the urgency of this problem and dictate the need for further research on both factors contributing to the development of mental disorders, and the clinical manifestations of these disorders in order to find measures for their prevention and treatment.

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Tyuvina N.A. https://orcid.org/0000-0002-5202-1407
Vysokova V.O. https://orcid.org/0000-0002-4087-1025
Maksimova T.N. https://orcid.org/0000-0001-9012-1727
Prokhorova S.V. https://orcid.org/0000-0002-5349-1187